

Feasibility Studies in IP Videoconferencing, Streaming, and Wireless Communication

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Abstract

Two feasibility studies were undertaken to determine how to use video streaming with other technologies over IP. One involved wireless technology to stream video live from the 2001 AMIA Symposium in Washington, DC. The other involved simultaneously webcasting a multipoint videoconference to a viewing audience that could communicate with the conference panelist using chat. The results of these tests are reported along with recommendations for further experiments. The outcomes have implications for the use of broadband synchronous communication in distance learning.

Background

Most distance learning on the Internet uses asynchronous communication. Human to human interaction, if offered, usually involves written communication, through email or message boards that are also asynchronous. One reason for asynchronous communication is that it has advantages of allowing access to education any time and any place.^{1,2} Distance learning research indicates that while students value this convenience, they also value learning in the presence of a group and interacting at the same time and place.^{4,5} The extent synchronous communication can create this sense of community or an environment accommodating the varied learning methodologies possible in classrooms is unknown. The technologies are new and typically discussed in reference to the future.⁶ Live webcasting and videoconferencing are two potentially useful technologies for synchronous communication that, when used in conjunction with wireless technology, allow nomadic communication. Webcasting videoconferences and using chat also has the potential of broadening participation. The efforts reported here were to determine whether using these various technologies together was feasible and, if so, to identify strategies that might facilitate their effectiveness.

Methods

In the poster session streaming experiment, a wireless base station using the 802.11b protocol was installed in the AMIA Scientific Poster area of the conference site. Streaming encoder software and a camera with built in microphone were installed on a laptop that was used to roam the area and conduct interviews. The encoded streams were sent via the Internet to a streaming server at the National Library of Medicine in Bethesda, Maryland, where they could be accessed over the Web. In the

videoconference experiment, panelists at four sites in four different time zones participated in a 'continuous presence' multipoint videoconference enabling each site to be seen at all times in a video window. A multipoint conferencing unit at the NLM reflected the information from each site to the others and to a machine re-encoding the video for webcast. Webcast viewers could use chat to communicate with panelists and each other.

Results

The tests proved the feasibility of wireless streaming and concurrently webcasting videoconferences over IP. In both cases, ambient sound, camera capabilities and other environmental/production factors negatively affected the webcast quality. The quality of the videoconference webcast also was degraded because re-encoding had to be done at a limited bit rate. Encoding delays limited the degree of real time interaction between webcast viewers and panelists using chat. Further experiments are needed to test feasibility of wireless videoconferencing and to verify production strategies that improve webcast quality.

References

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